CLAIMS

WHAT IS CLAIMED:

1. 1. A process for use in fabricating an integrated circuit, comprising:
2. performing an operation on a wafer using a fabrication tool;
3. generating desorbed volatiles from the wafer after performing the operation;
4. sampling the desorbed volatiles;
5. generating raw spectral data from the sampled desorbed volatiles, the raw spectral
6. data indicating the content of the desorbed volatiles;
7. performing a spectroscopic analysis of the raw spectral data; and
8. modifying an operational parameter of the fabrication tool responsive to the result of
9. the results of the spectroscopic analysis.

1. 2. The process of claim 1, wherein performing an operation on a wafer using a
2. fabrication tool includes performing a chemical mechanical polishing operation, a plasma
3. etching operation, or a wafer cleaning operation.

1. 3. The process of claim 2, wherein modifying the operational parameter of the
2. fabrication tool includes increasing a rinse time or increasing a polishing time of the chemical
3. mechanical polishing operation.

1. 4. The process of claim 1, wherein modifying the operational parameter of the
2. fabrication tool includes increasing a rinse time of a chemical mechanical polishing
3. operation, increasing a polishing time of a chemical mechanical polishing operation, resetting
4. a scheduled maintenance time.

1. 5. The process of claim 1, wherein generating desorbed volatiles from the wafer
2. after performing the operation includes heating the wafer in a vacuum chamber to generate
3. desorbed volatiles.

1. 6. The process of claim 5, wherein heating the wafer in a vacuum chamber
2. includes heating the wafer in a lamp degas chamber or a pedestal temperature controlled
3. process chamber.

1. 7. The process of claim 1, wherein sampling the desorbed volatiles includes
2. sampling the desorbed volatiles with a residual gas analyzer.

1   8.   The process of claim 1, wherein modifying the operational parameter includes

2   issuing a new APC plan.

1   9.   The process of claim 1, further comprising at least one of:

2   storing the results of the spectroscopic analysis;

3   performing a trend analysis on the results of the spectroscopic analysis; and

4   performing a variability analysis on the results of the spectroscopic analysis.

1   10.   A process for use in fabricating an integrated circuit, comprising:

2   receiving raw spectral data representative of the content of a plurality of volatiles

3   desorbed from a wafer;

4   processing the raw spectral data to determine the presence of a residual material on

5   the wafer; and

6   controlling a process flow operation to reduce the amount of the residual material on

7   the wafer responsive to the results of processing the raw spectral data.

1   11.   The process of claim 10, wherein receiving the raw spectral data includes

2   receiving the raw spectral data through at least one of a sensor interface and a data handler.

1   12.   The process of claim 10, wherein processing the raw spectral data includes

2   performing a spectroscopic analysis on the raw spectral data.

1   13.   The process of claim 10, wherein controlling the process flow operation to

2   reduce the amount of the residual material on the wafer includes modifying an operational

3   parameter of a fabrication tool.

1   14.   The process of claim 13, wherein modifying the operational parameter

2   includes issuing a new APC plan.

1   15.   The process of claim 10, further comprising at least one of:

2   storing the results of the spectroscopic analysis;

3   performing a trend analysis on the results of the spectroscopic analysis; and

4   performing a variability analysis on the results of the spectroscopic analysis.

16. A program storage medium encoded with instructions that, when executed by a computer, perform a method for use in fabricating an integrated circuit, the method comprising:

receiving raw spectral data representative of the content of a plurality of volatiles desorbed from a wafer;

processing the raw spectral data to determine the presence of a residual material on the wafer; and

controlling a process flow operation to reduce the amount of the residual material on the wafer responsive to the results of processing the raw spectral data.

17. The program storage medium of claim 16, wherein receiving the raw spectral data in the encoded method includes receiving the raw spectral data through at least one of a sensor interface and a data handler.

18. The program storage medium of claim 16, wherein processing the raw spectral data in the encoded method includes performing a spectroscopic analysis on the raw spectral data.

19. The program storage medium of claim 16, wherein controlling the process flow operation to reduce the amount of the residual material on the wafer in the encoded method includes modifying an operational parameter of a fabrication tool.

20. The program storage medium of claim 19, wherein modifying the operational parameter in the encoded method includes issuing a new APC plan.

21. The program storage medium of claim 16, wherein the encoded method further comprising at least one of:

storing the results of the spectroscopic analysis;

performing a trend analysis on the results of the spectroscopic analysis; and

performing a variability analysis on the results of the spectroscopic analysis.

22. A computer programmed to perform a method for use in fabricating an integrated circuit, the method comprising:

receiving raw spectral data representative of the content of a plurality of volatiles desorbed from a wafer;

5 processing the raw spectral data to determine the presence of a residual material on

6 the wafer; and

7 controlling a process flow operation to reduce the amount of the residual material on

8 the wafer responsive to the results of processing the raw spectral data.

1 23.   The programmed computer of claim 22, wherein receiving the raw spectral

2 data in the programmed method includes receiving the raw spectral data through at least one

3 of a sensor interface and a data handler.

1 24.   The programmed computer of claim 22, wherein processing the raw spectral

2 data in the programmed method includes performing a spectroscopic analysis on the raw

3 spectral data.

25.   The programmed computer of claim 22, wherein controlling the process flow

operation to reduce the amount of the residual material on the wafer in the programmed

method includes modifying an operational parameter of a fabrication tool.

26.   The programmed computer of claim 25, wherein modifying the operational

parameter in the programmed method includes issuing a new APC plan.

27.   The programmed computer of claim 22, wherein the programmed method

further comprising at least one of:

3 storing the results of the spectroscopic analysis;

4 performing a trend analysis on the results of the spectroscopic analysis; and

5 performing a variability analysis on the results of the spectroscopic analysis.

1 28.   An apparatus for processing wafers to fabricate integrated circuits thereon,

2 comprising:

3 a fabrication tool capable of performing an operation defined by a plurality of

4 operational parameters;

5 a vacuum chamber for processing a wafer processed by the fabrication tool;

6 a residual gas analyzer positioned in the vacuum chamber to sample volatiles

7 desorbed by the wafer when the wafer is heated in a vacuum and output data

8 indicating the content of the desorbed volatiles; and

9   a computer system capable of performing a spectroscopic analysis on the data output

10   by the residual gas analyzer and adjusting at least one operational parameter of

11   the fabrication tool responsive to the results of the spectroscopic analysis.

1   29.   The apparatus of claim 28, wherein the fabrication tool includes a chemical

2   mechanical polishing tool, a plasma etching tool, or a wafer cleaning tool.

1   30.   The apparatus of claim 28, wherein the vacuum chamber comprises a portion

2   of a vacuum cluster tool.

1   31.   The apparatus of claim 28, wherein the vacuum chamber comprises a lamp

2   degas chamber or a pedestal temperature controlled process chamber.

1   32.   The apparatus of claim 28, wherein the computer system comprising a

2   plurality of networked computing devices.

1   33.   The apparatus of claim 28, wherein the computer system comprises an

2   Advanced Process Control System.

1   34.   The apparatus of claim 28, wherein at least a part of the computer system

2   resides on at least one of the fabrication tool and the vacuum chamber.

1   35.   The apparatus of claim 28, further comprising a second fabrication tool of

2   which the vacuum chamber comprising a portion.

1   36.   The apparatus of claim 28, wherein the vacuum chamber comprises a portion

2   of the fabrication tool.